IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of:	)	
Ye FANG *et al.*	)	Confirmation No.: 1181
Application No.: **10/602,242**	)	Examiner: Nelson C. Yang
Filed: **June 24, 2003**	)	Art Unit: 1641
For: **TOXIN DETECTION AND COMPOUND SCREENING USING BIOLOGICAL MEMBRANE MICROARRAYS**	)	

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

As set forth in the Notice of Appeal filed December 20, 2005, Appellants hereby appeal the Examiner's final rejection of claims 1, 2, 4, 5, 9-18 and 42-61 of the above-identified application. Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the final rejection of these claims.

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I. REAL PARTY IN INTEREST

Corning Incorporated, Corning, N.Y., is the assignee and real party in interest.

II. RELATED APPEALS AND INTERFERENCES

At present, there are no related appeals or interferences known to the Appellants, the Appellants' representative or the assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

For the purposes of this Appeal, claims 1, 2, 4, 5, 9-18 and 42-61 stand finally rejected and are the subject of this appeal. Claims 19-26 and 28-41 are canceled. Appealed claims 1, 2, 4, 5, 9-18 and 42-61, are set forth in the Claims Appendix herewith.

IV. STATUS OF AMENDMENTS

On December 20, 2005, Appellants filed a Response to Final Office Action in response to the Final Office Action mailed September 20, 2005. This response included an amendment canceling claims 3, 6-8 and 27. The Examiner issued an Advisory Action on January 26, 2006, but the Advisory Action fails to indicate whether Appellants' cancellation of claims 3, 6-8 and 27 was entered for the purpose of this appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

This Appeal is taken from claims 1, 2, 4, 5, 9-18 and 42-61, of which claims 1, 42, 49 and 57 are independent.

Claim 1, the present invention recited therein relates to a method for detecting and identifying a toxin in a sample that includes the steps of (1) providing an array comprising a plurality of biological membranes associated with a surface of a substrate, wherein the surface comprises a coating of an amine-presenting molecule, and the biological membranes are deposited directly to the coating; (2) contacting the array with a solution comprising a target compound; and (3) monitoring for binding activity of at least one biological membrane with the target compound. Support for the claimed features can be found at least on *e.g.*, pages 3-5 and 8-13 (paragraphs 13, 42 and 45) of the specification.

Claim 42, the present invention recited therein relates to a method for detecting a binding event between a probe and target compound that includes the steps of (1) providing

an array comprising a plurality of biological membrane microspots associated with a surface of a substrate, wherein the surface comprises a coating of an amine-presenting molecule, and each of the biological membrane microspots comprises a biological membrane directly deposited to the coating; (2) contacting a solution comprising a target compound with the array of probe biological membrane microspots; and (3) detecting a binding event between at least one or more of the probe microspots with one or more constituents of the target compound. Support for the claimed features can be found at least on *e.g.*, pages 3-5, 8-13 (paragraphs 13, 42 and 45), page 9, paragraph 33, lines 4-6, and page 10, paragraph 37 of the specification.

Claim 49, the present invention recited therein relates to a method for identifying and detecting a toxin in a sample that includes the steps of (1) providing an array comprising a plurality of biological membrane microspots associated with a surface of a substrate, wherein the surface comprises a coating of an amine-presenting molecule, and each of the biological membrane microspots comprises a biological membrane directly deposited to the coating; (2) contacting a sample solution comprising an unknown toxin with the array of biological membrane microspots; and (3) detecting the binding profile of the unknown toxin to at least one or more of the microspots. Support for the claimed features can be found at least on *e.g.*, pages 3-5, 8-13 (paragraphs 13, 42 and 45), and page 10, lines 1-2 and paragraph 37 of the specification.

Claim 57, the present invention recited therein relates to a method for detecting a binding event between a receptor in a biological membrane and a target compound that includes the steps of (1) contacting a solution comprising the target compound with an array which comprises a plurality of biological membranes directly deposited to a coating on a surface of the array, each of the biological membranes comprising a receptor of interest; and (2) detecting a binding event between one or more of the biological membranes and one or more constituents of the target compound, wherein the coating comprises an amine-presenting molecule or a silane. Support for the claimed features can be found at least on *e.g.*, pages 3-5, 8-13 (paragraphs 13, 42 and 45), page 9, paragraph 33, lines 4-6, and page 10, lines 1-2 of the specification.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants respectfully request the Board to reverse the following grounds of rejection:

(A) The rejection of claims 1, 2, 4-5, 9-16, 18, 42-50, 52, 54 and 56-58 under 35 U.S.C. § 103(a) as being obvious over Yamazaki *et al.* (U.S. Patent No. 6,699,719; hereinafter "Yamazaki"), in view of Ness *et al.* (U.S. Patent No. 6,150,103; hereinafter "Ness");

(B) The rejection of claim 17 under 35 U.S.C. § 103(a) as being obvious over Yamazaki, in view of Ness, and in further view of Pluskal *et al.* (U.S. Patent No. 5,004,543; hereinafter "Pluskal");

(C) The rejection of claims 1, 2, 4-5, 9-16, 18, 42-51, 53, 55 and 57-61 under 35 U.S.C. § 103(a) as being obvious over Yamazaki, in view of Nova *et al.* (U.S. Patent No. 5,741,462; hereinafter "Nova"); and

(D) The rejection of claim 17 under 35 U.S.C. § 103(a) as being obvious over Yamazaki, in view of Nova and in further view of Pluskal, for the reasons set forth on pages 2-8 of the Office Action mailed September 20, 2005.

VII. ARGUMENTS

A. The Rejection of Claims 1, 2, 4-5, 9-16, 42-50, 52, 54 and 56-58 under 35 U.S.C. § 103(a) as Obvious over Yamazaki, in View of Ness

Claims 1, 2, 4-5, 9-16, 18, 42-50, 52, 54 and 56-58 stand rejected under 35 U.S.C. § 103(a), as being obvious over Yamazaki, in view of Ness. Appellants appeal this rejection and request reversal for at least the following reasons.

Claim 1 recites "said surface comprises a coating of an amine-presenting molecule, and said biological membranes are deposited directly to said coating." Claims 42 and 49 recite "said surface comprises a coating of an amine-presenting molecule, and each of said biological membrane microspots comprises a biological membrane directly deposited to said coating."

Yamazaki neither teaches nor suggests the use of biological membranes directly deposited to a coating of amine-presenting molecules. Yamazaki does, however, describe the fabrication of arrays of fluid bilayer membranes, but the bilayer membranes employed in Yamazaki are separated from the supporting surface by "an aqueous film of corresponding thickness." *See* column 8, lines 1-11. This aqueous film can be made of "a buffered saline solution (*e.g.*, PBS)" and can be "readily changed (taking care, of course, to keep the supported bilayer submerged at all times) by, *e.g.*, flow-through rinsing with a solution having a different composition." *See* column 10, lines 4-9. Accordingly, Appellants respectfully submit that Yamazaki fails to teach or suggest the use of biological membranes that are directly deposited to a coating of amine-presenting molecules.

The combination with Ness does not remedy this deficiency. Ness describes an array of biomolecules in which the biomolecules are positioned throughout a polyethyleneimine layer overlying a substrate of the array. The biomolecules employed in Ness, however, are not biological membranes. Biomolecules, even with large sizes or molecular weights, are structurally and functionally different from biological membranes. Accordingly, Ness, as with the primary reference, Yamazaki, fails to teach or suggest the use of biological membranes that are deposited to a coating of amine-presenting molecules.

Because Yamazaki and Ness neither disclose nor suggest each and every element of claims 1, 42, and 49, Appellants respectfully submit that Yamazaki and Ness do not render these claims obvious. *See* MPEP §2143.03 ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art").

For similar reasons, Appellants respectfully submit that Yamazaki and Ness, either individually or in combination, also fail to teach or suggest the elements of claim 57. Claim 57 recites "a plurality of biological membranes directly deposited to a coating on a surface of said array" and "said coating comprises an amine-presenting molecule or a silane." As noted above, the bilayer membrane employed in Yamazaki is separated from the supporting surface by an aqueous film and, therefore, is not deposited directly to a coating of amine-presenting or silane molecules. Ness likewise does not teach or suggest the use of biological membranes. Accordingly, Yamazaki and Ness do not teach or suggest all of the elements of claim 57 and, therefore, do not render claim 57 obvious.

In addition, Appellants respectfully submit that Yamazaki implicitly teaches away from the methods recited in claims 1, 42, 49, and 52, and the claims dependent thereon. In particular, Yamazaki describes that a thin polymer film (e.g., polyacrylamide or dextran) can

be deposited to an array surface to form bilayer-compatible regions and that this thin polymer film can be coupled to the array surface by 3-methacryl-oxypropyl-trimethoxy-silane. *See* column 18, lines 20-29. By not depositing bilayer membranes directly to 3-methacryl-oxypropyl-trimethoxy-silane, Yamazaki implicitly teaches that direct deposition of bilayers to silane is undesirable. Accordingly, Appellants respectfully submit that Yamazaki teaches away from the techniques set forth in the present invention, particularly the methods recited in claims 1, 42, 49, and 52.

Appellants also respectfully submit that the Office Action has failed to establish any motivation to combine Yamazaki and Ness. The Federal Circuit has repeatedly emphasized that evidence of a motivation to combine must accompany a challenge based on multiple references. *See In re Dembiczak*, 175 F.3d 994 (Fed. Cir. 1999) and *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534 (Fed. Cir. 1998). *See also* MPEP §2143.01 (The prior art must suggest the desirability of the claimed invention). As the Federal Circuit observed, the "case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." *See In re Dembiczak*, 175 F.3d 994, 998, 999 (Fed. Cir. 1999).

On page 3, the Office Action contends that "it would have been obvious to one of ordinary skill in the art for the support to have a layer of PEI in the method of Yamazaki *et al.* to bind biomolecules such as bilayer membranes, as Ness *et al.* suggests that PEI is effective in binding biomolecules due to its hydrophilicity, and the fact that PEI contains many amino groups for forming salts with acidic groups in biomolecules." However, Appellants respectfully submit that a mere statement that a prior art combination, allegedly meeting the claimed invention, would have been within the ordinary skill in the art is not alone sufficient to establish a prima facie case of obviousness. *See* MPEP §2143.01 (emphasis added). Accordingly, Appellants respectfully request that the Examiner provide documentary proof to substantiate the alleged motivation to combine Yamazaki and Ness. Moreover, as noted above, Yamazaki contemplates the use of a thin polymer film which is coupled to the array surface by 3-methacryl-oxypropyl-trimethoxy-silane. By not using 3-methacryl-oxypropyl-trimethoxy-silane for membrane deposition, Appellants respectfully submit that Yamazaki teaches away from the use of silane and other functionally similar molecules, such as PEI, for membrane deposition.

On page 8, the Office Action further contends that "the motivation is that PEI is very effective in the capacity of binding biomolecules due to its hydrophilicity, and the fact that PEI contains many amino groups which can form salts with acidic groups in a biomolecule." However, this alleged motivation is very different from a motivation to deposit biological membranes to a PEI coating for assessing the interactions between membranes and ligands or toxins. In fact, it is un-expected prior to the present invention that a substantial portion of membranes deposited to a silane or amine coating would resist desorption and exhibit desired lateral fluidity. *See* paragraph 41 on page 12 of the present application. These properties enable a meaningful assessment of the interactions between deposited biological membranes and ligands or toxins. Neither Yamazaki nor Ness suggests this advantage, and Appellants need more guidance from the Examiner on the alleged motivation to combine. *See In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000) ("Particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed") (emphasis added). *See also In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998) ("In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed") (emphasis added).

Based on all of the above reasons, Appellants respectfully submit that the Office Action has failed to establish *prima facie* obviousness of claims 1, 42, 49, and 57. Accordingly, Appellants respectfully request the Board to reverse the final rejections of claims 1, 42, 49, and 57.

Because claims 2, 4-5, 9-16 and 18 depend from claim 1, claims 43-48 and 54 depend from claim 42, claims 50 and 56 depend from claim 49, and claim 58 depends from claim 57, Appellants respectfully submit that claims 2, 4-5, 16, 18, 43-48, 50, 54, 56 and 58 are also patentable over Yamazaki, in view of Ness, at least for the reasons set forth hereinabove. Accordingly, Appellants respectfully request the Board to reverse the final rejections of 2, 4-5, 16, 18, 43-48, 50, 54, 56 and 58.

B. The Rejection of Claims 17 Under 35 U.S.C. § 103(a) as Obvious Over Yamazaki, in View of Ness, and in Further View of Pluskal

Claim 17 stands rejected under 35 U.S.C. § 103(a), as being obvious over Yamazaki, in view of Ness, and in further view of Pluskal. Appellants appeal this rejection and requests reversal for at least the following reasons.

Claim 17 depends from claim 1. As discussed above, Appellants respectfully submit that Yamazaki and Ness neither disclose nor suggest the invention of claim 1. Accordingly, Yamazaki and Ness do not teach or suggest each and every element of claim 17.

The proposed combination with the tertiary reference, Pluskal, does not remedy this deficiency. Pluskal relates to a hydrophobic material having a crosslinked, cationic charge-modifying coating such that the majority of the ion exchange capacity of the material is provided by fixed formal positive charge groups. Pluskal does not describe any biological membrane deposited to a coating of amine-presenting molecules. Accordingly, Pluskal is outside the purview of the present invention, particularly claim 17, and adds nothing to the other references.

Because Yamazaki, Ness and Pluskal, either individually or in combination, do not teach or suggest the elements of claim 17, Appellants respectfully submit that these references do not render claim 17 obvious. *See* MPEP §2143.03 ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art").

Appellants also respectfully submit that the Office Action has failed to establish any motivation to combine Yamazaki, Ness and Pluskal. The Federal Circuit has repeatedly emphasized that evidence of a motivation to combine must accompany a challenge based on multiple references. *See In re Dembiczak, ATD Corp. v. Lydall, Inc.*, and the MPEP, as cited and quoted hereinabove.

On page 5, the Office Action contends that "it would have been obvious to one of ordinary skill in the art to have a charge-modified, hydrophobic microporous membrane as the support in the method of Yamazaki *et al.* and Ness *et al.*, as suggested by Pluskal *et al.*, as the membrane is highly effective for macromolecular adsorption applications under a variety of conditions." However, Appellants again respectfully submit that a mere statement that a prior art combination, allegedly meeting the claimed invention, would have been within the ordinary skill in the art is not alone sufficient to establish a prima facie case of obviousness. *See* MPEP §2143.01 (emphasis added). Accordingly, Appellants respectfully request that the

Examiner provide some form of documentary proof to substantiate the alleged motivation to combine the disparate references Yamazaki, Ness and Pluskal.

Based on all of the above reasons, Appellants respectfully submit that the Office Action has failed to establish *prima facie* obviousness of claim 17. Accordingly, Appellants respectfully request the Board to reverse the final rejection of claim 17.

C. The Rejection of Claims 1, 2, 4-5, 9-16, 18, 42-51, 53, 55 and 57-61 under 35 U.S.C. § 103(a) as Obvious over Yamazaki, in View of Nova

Claims 1, 2, 4-5, 9-16, 18, 42-51, 53, 55, and 57-61 stand rejected as being obvious over Yamazaki, in view of Nova.

Appellants respectfully submit that Yamazaki and Nova, either alone or in combination, fail to teach or suggest each and every element of claims 1, 42, 49, and 57. As discussed above, Yamazaki neither teaches nor suggests the use of biological membranes deposited to a coating of amine-presenting or silane molecules. Nova relates to matrix materials with remotely addressable or remotely programmable recording devices that contain data storage units. Nova describes that a data storage device with memory can be coated with a polymer, which is then treated to contain an appropriate reactive moiety or, in some cases, the device may be obtained commercially already containing the reactive moiety, and may thereby serve as the matrix support upon which molecules or biological particles are linked. *See* column 15, lines 13-18. Nova also describes that the reactive moieties can be "amino silane linkages, hydroxyl linkages or carboxysilane linkages." *See* column 15, lines 19-20. However, Nova does not teach or suggest using these reactive moieties for the deposition of biological membranes for the assessment of interactions between membranes and ligands or toxins, as set forth in the presently-claimed invention. Accordingly, Appellants respectfully submit that Nova neither discloses nor suggests the elements of claims 1, 42, 49, and 57.

Because Yamazaki and Nova, either individually or in combination, do not teach or suggest the invention of claims 1, 42, 49, and 57, Appellants respectfully submit that these references do not render claims 1, 2, 4-5, 9-16, 18, 42-51, 53, 55 and 57-61 obvious. *See* MPEP §2143.03 ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art").

Furthermore, Appellants respectfully submit that the Office Action has failed to establish any motivation to combine Yamazaki and Nova. Specifically, Appellants

respectfully submit that Yamazaki and Nova do not teach or suggest that deposition of a biological membrane to a coating of amine-presenting or silane molecules would maintain the membrane's lateral fluidity. In fact, Appellants respectfully submit that it is un-expected, prior to the present invention, that a substantial portion of membranes deposited to a silane or amine coating would resist desorption and exhibit desired lateral fluidity. *See* paragraph 41 on page 12 of the present application. Neither Yamazaki nor Nova discloses or suggests this advantage. Accordingly, Appellants respectfully submit that the Office Action has failed to identify any motivation to make a biological membrane deposited to a coating of amine-presenting or silane molecules. *See In re Kotzab* and *In re Rouffet*, as cited and quoted hereinabove.

In addition, as noted above, Appellants respectfully submit that Yamazaki teaches away from the present invention.

On page 6, the Office Action contends that it would have been obvious to one of ordinary skill in the art to treat an array with γ-aminopropylsilane or carboxysilanes in the method of Yamazaki, as suggested by Nova, in order to obtain an appropriate reactive moiety to link molecules or biological particles. However, as noted, a mere statement that a prior art combination, allegedly meeting the claimed invention, would have been within the ordinary skill in the art is not alone sufficient to establish a prima facie case of obviousness. *See* MPEP §2143.01 (emphasis added). *See also* MPEP §2143.01 (The prior art must suggest the desirability of the claimed invention). As the Federal Circuit observed, the "case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." *See In re Dembiczak. See also In re Kotzab* and *In re Rouffet*, as cited and quoted hereinabove.

Based on all of the above reasons, Appellants respectfully submit that the Office Action has failed to identify any motivation to combine Yamazaki and Nova and, therefore, failed to establish *prima facie* obviousness of claims 1, 42, 49, and 57. Accordingly, Appellants respectfully request the Board to reverse the final rejection of these claims.

Because claims 2, 4-5, 9-16, 18 and 51 depend from claim 1, claims 43-48 and 53 depend from claim 42, claims 50 and 55 depend from claim 49, and claims 58-61 depend from claim 57, Appellants respectfully submit that these claims are also patentable over Yamazaki, in view of Nova, at least for the reasons set forth above. Accordingly, Appellants respectfully request the Board to reverse the final rejection of these claims.

D. The Rejection of Claims 17 Under 35 U.S.C. § 103(a) as Obvious Over Yamazaki, in View of Nova and Pluskal

Claims 17 stands rejected as being obvious over Yamazaki, in view of Nova and Pluskal. Claim 17 depends from claim 1. As discussed above, Yamazaki, Nova and Pluskal, do not teach or suggest each and every element of claim 1. Accordingly, Appellants respectfully submit that these references neither disclose nor suggest the elements of claim 17. Therefore, Appellants respectfully submit that Yamazaki, Nova and Pluska do not render claim 17 obvious. *See* MPEP §2143.03 ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art").

Appellants also respectfully submit that the Office Action has failed to establish any motivation to combine Yamazaki, Nova and Pluskal. The Federal Circuit has repeatedly emphasized that evidence of a motivation to combine must accompany a challenge based on multiple references to avoid hindsight analyses. *In re Dembiczak*, *ATD Corp. v. Lydall, Inc.*, and the MPEP, as cited and quoted hereinabove.

On page 8, the Office Action contends that "it would have been obvious to one of ordinary skill in the art to have a charge-modified, hydrophobic microporous membrane as the support in the method of Yamazaki *et al.* and Nova *et al.*, as suggested by Pluskal *et al*, as the membrane is highly effective for macromolecular adsorption applications under a variety of conditions." However, a general statement that a prior art combination, allegedly meeting the claimed invention, would have been within the ordinary skill in the art is not alone sufficient to establish a prima facie case of obviousness. *See* MPEP §2143.01 (emphasis added). Accordingly, Appellants respectfully request the Examiner to provide some form of documentary proof to substantiate the alleged motivation to combine Yamazaki, Ness and Pluskal.

Based on all of the above reasons, Appellants respectfully request the Board to reverse the final rejection of claim 17.

VIII. CONCLUSION

Since the Examiner's final rejections under 35 U.S.C. § 103(a) are inappropriate for the reasons set forth above, Appellants respectfully request the Board to reverse each ground of the rejections.

Respectfully submitted,
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Date: May 22, 2006

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IX. CLAIMS APPENDIX

1. A method for detecting and identifying a toxin in a sample, the method comprises: providing an array comprising a plurality of biological membranes associated with a surface of a substrate, wherein said surface comprises a coating of an amine-presenting molecule, and said biological membranes are deposited directly to said coating; contacting the array with a solution comprising a target compound; and monitoring for binding activity of at least one biological membrane with said target compound.

2. The method according to claim 1 , wherein said biological membranes contain a toxin-binding moiety.

4. The method according to claim 2, wherein said-toxin binding moiety is a carbohydrate.

5 The method according to claim 4, wherein said carbohydrate moiety is a ganglioside.

9 The method according to claim 1, wherein said biological membranes are arranged in distinct microspots.

10 The method according to claim 1, wherein said target compound has at least one constituent that is labeled.

11. The method according to claim 10, wherein said monitoring step comprises detecting for the presence of the label.

12. The method according to claim 1 , wherein the monitoring step comprises detecting directly a physical change due to the binding of said target compound to said biological membranes.

13 The method according to claim 1 , wherein the target compound has no labeled constituent.

14. The method according to claim 1, wherein said method employs a labeled toxin or known compounds with an affinity to the toxin molecule or to the receptor site.

15. The method according to claim 1, said toxin detection sample can be a synthetic or natural toxin, or from a human, animal, plant, food, or environmental source.

16. The method of claim 1, wherein the substrate includes a glass, ceramic, metal-oxide, metal, non-metal, silicon, or polymer material.

17. The method according to claim 1, wherein said substrate is either nano- or micro-porous.

18. The method according to claim 1, wherein the substrate is configured as a bead, chip, a slide, a multiwell microplate, or a microcolumn.

42. A method for detecting a binding event between a probe and target compound, said method comprising: providing an array comprising a plurality of biological membrane microspots associated with a surface of a substrate, wherein said surface comprises a coating of an amine-presenting molecule, and each of said biological membrane microspots comprises a biological membrane directly deposited to said coating; contacting a solution comprising a target compound with said array of probe biological membrane microspots; and detecting a binding event between at least one or more of the probe microspots with one or more constituents of the target compound.

43. The method of claim 42, wherein at least one of the constituents of the target is labeled and the detection step comprises detecting the presence of the label.

44. The method of claim 42, wherein the detection of the label is carried out by imaging based on fluorescence, phosphorescence, chemiluminescence, or resonance light scattering emanating from the bound target.

45. The method of claim 42, further comprising washing the substrate of unbound target prior to the detection step.

46. The method of claim 42, wherein the array of microspots is incubated with labeled target and an unlabeled target compound, and the binding event between the unlabeled target compound and the probe is determined by measuring a decrease in the signal of the label due to competition between the labeled target and the unlabeled target compound for the probe.

47. The method of claim 42, wherein the target is unlabeled and the binding event is determined by a change in physical properties at the interface.

48. The method of claim 47, wherein the change in physical properties at the interface is a change in refractive index or electrical impedance.

49. A method for identifying and detecting a toxin in a sample, said method comprising: providing an array comprising a plurality of biological membrane microspots associated with a surface of a substrate, wherein said surface comprises a coating of an amine-presenting molecule, and each of said biological membrane microspots comprises a biological membrane directly deposited to said coating; contacting a sample solution comprising an unknown toxin with said array of biological membrane microspots; and detecting the binding profile of the unknown toxin to at least one or more of the microspots.

50. The method of claim 49, wherein the sample is a biofluid from a specific infectious tissue, a solution from food or environmental sources or an aqueous solution comprising chemical toxins collected or concentrated from a contaminated gaseous media.

51. The method according to claim 1, wherein said amine-presenting molecule is γ-aminopropylsilane.

52. The method according to claim 1, wherein said amine-presenting molecule is selected from the group consisting of poly-lysine, polyethyleneimine, and chitosan.

53. The method according to claim 42, wherein said amine-presenting molecule is γ-aminopropylsilane.

54. The method according to claim 42, wherein said amine-presenting molecule is selected from the group consisting of poly-lysine, polyethyleneimine, and chitosan.

55. The method according to claim 49, wherein said amine-presenting molecule is γ-aminopropylsilane.

56. The method according to claim 49, wherein said amine-presenting molecule is selected from the group consisting of poly-lysine, polyethyleneimine, and chitosan.

57. A method for detecting a binding event between a receptor in a biological membrane and a target compound, said method comprising:

contacting a solution comprising the target compound with an array which comprises a plurality of biological membranes directly deposited to a coating on a surface of said array, each of said biological membranes comprising a receptor of interest; and

detecting a binding event between one or more said biological membranes and one or more constituents of the target compound,

wherein said coating comprises an amine-presenting molecule or a silane.

58. The method of claim 57, wherein said coating consists of a coating of said amine-presenting molecule.

59. The method of claim 58, wherein said amine-presenting molecule is selected from the group consisting of γ-aminopropylsilane, polyamine, and chitosan.

60. The method of claim 57, wherein said coating comprises a coating of said silane.

61. The method of claim 60, wherein said silane comprises a hydroxyl, a carboxyl, a phosphate, a sulfonated, or a thiol group.

X. EVIDENCE APPENDIX

There are no related evidence to submit at this time.

XI. RELATED PROCEEDINGS APPENDIX

There are no related proceedings to this Appeal.